

**Appl. No. : 10/759,925**  
**Filed : January 16, 2004**

#### **AMENDMENTS TO THE DRAWINGS**

In FIG. 4A and FIG. 4B, please replace item number "24," regarding the body, with item number "224." Additionally, please replace item number "30," regarding the valve body, with item number "230."

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### **REMARKS**

Claims 1-12 and 15-22 were rejected. Claims 2-10 and 12-22 have been cancelled. This is not meant to imply that the Applicants are surrendering this subject matter, and Applicants reserved the right to pursue these claims at a later point in time.

New Claims 23-39 have been added, and the new claims address the Examiner's issue regarding the relevance of certain elements in method claims (pages 7 & 8 of the Office Action, discussed in greater detail below). Claims 1, 11, and 23-39 are presently pending. Claims 1 and 11 are presently amended. Support for the amendments can be found in the specification and the original claims, for example, Claims 1, 10, and 11.

Applicants note that the currently pending claims recite either a "through-flow" valve device or the result of using a through-flow valve. As explained in greater detail below, this device has not been employed in a method or apparatus, as claimed, previously. Applicants note that the "through-flow" valve is explicitly defined in the application (*e.g.*, paragraphs 0098 and 0099 of the application as submitted). Applicants note that there were and currently are claims to a method that employs such a device in the prior and current Claims (*e.g.*, Claims 10 and 21). As such, Applicants submit that an additional search or review of the claimed material is not necessary, as the presently claimed methods were previously recited in Claims 10 and 21. Support for these amendments can be found in the original claims and throughout the specification. For example, support can be found in prior Claims 1, 6, 12, and paragraphs 0020, 0023-0025, 0050, 0083, and 0096 of the published specification. Support for the new claims can be found in the claims and the specification, including those sections identified above. For example, support can be found in original Claims 1-22, Figure 1, and paragraphs 0023, 0115, and 0118-0120, of the published application. The specification and drawings have been amended in light of the Examiner's comment regarding items numbers 24 and 30 and to clarify the difference between FIG. 4a and FIG 4b, support for the amendments can be found within the relevant paragraphs and the relevant figures. No new matter has been added by these amendments.

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### Drawings

Applicants thank Examiner Kornakov for pointing out that the item numbers for the monitor and the body, as well as the item numbers for the CVD device and the valve body were the same. Applicants have submitted replacement sheets for FIGS. 4A and 4B. The figures now depict the following: monitor 24, CVD device 30, body 224, and valve body 230. Additionally, the specification (at paragraphs 0119 and 0120) has been amended to reflect these adjustments as well.

### Rejection of Claims 1-12 and 15-22 under 35 U.S.C. 112, Enablement

Applicants have cancelled Claims 2-10 and 15-22; thus, only the rejections of Claims 1 and 11 are relevant to this discussion. It has been asserted that while the application is enabling for a chamber with an anodized aluminum alloy wall, it is not so enabling for a discharge chamber with an aluminum alloy wall. Applicants respectfully disagree. Applicants note that the Office Action does not provide a *prima facie* case of lack of enablement. The Examiner is respectfully reminded that “[i]n order to make a rejection, the examiner has the initial burden to establish a reasonable basis to question the enablement provided for the claimed invention. *In re Wright*, 999 F.2d 1557, 1562, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993) (examiner must provide a reasonable explanation as to why the scope of protection provided by a claim is not adequately enabled by the disclosure).” (M.P.E.P. §2164.04). In the present case, no reason is supplied for why the teaching in the specification is not adequate has been provided. Rather, the Examiner has only asserted that the teaching is not commensurate with the scope of the claims. Applicants submit that a reason should be provided why such is the case.

However, in the interest of furthering an allowance of the instant case, Applicants have amended Claim 1 to recite the term “anodized.” In light of the amendment and the above arguments, Applicants request that the rejection be withdrawn and the claims allowed. Applicants note that new Claims 23-33 also recite such an element. New Claims 34-39 do not recite the material of which the chamber is made.

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Rejection of Claims 1-8, 12, and 15-19 under 35 U.S.C. §103(a) over EP 0697467 in view of Smith et al (U.S. 6,150,628)

Pending Claim 1 has been rejected under 35 U.S.C. §103(a) as being unpatentable over EP 0697467 ("EP '467") in light of Smith et al. (U.S. Pat. No. 6,150,628, hereinafter "Smith"). Claim 1 has been amended to incorporate the elements recited in prior Claim 10.

Applicants traverse the rejections and submit that the Examiner has supplied no reason or evidence to support the assertion that the prior art was capable of achieving the recited rates, at the recited power levels, through optimization of various variables.

However, Applicants submit that the rejections are moot in view of the deletion of the etch rates from Independent Claim 1 and the addition of the element of "withdrawing a valve body completely from a path to form an opening substantially as wide as internal surfaces of the piping".

Claims 23-39 recite a physical structure capable of performing the operation recited in current Claim 1 and prior Claim 10 (*see, e.g.*, paragraphs 0118-0120 for support and a description of one embodiment of the through-flow device). As such, Claims 1 and 23-39 recite an element which is not taught by the prior art in this combination, (withdrawing a valve body completely from a path to form an opening substantially as wide as internal surfaces of the piping or a through-flow valve). Because not all of the elements of amended Claim 1, as well as new Claims 23-39, have been taught, a *prima facie* case of obviousness has not been established. As such, Applicants request that the rejection be withdrawn and the claims allowed. The non-obviousness of the recited inventions will be addressed below with respect to the Examiner's rejections of Claims 9-11 and 20-22.

Note also that, Applicants have further amended Claim 1 to recite that the method uses piping that has an internal surface that is a fluorine passivated surface. As noted in the specification, this is one of the reasons that the method is able to achieve superior cleaning results. There are many advantages to a method that employs such a structure. For example, use of materials inert to fluorine active species for internal surfaces of the piping allows for the elimination of adsorption or reaction of fluorine active species or fluoride gas onto the internal surface of the piping during operation. Thus, the occurrence of fluorine active species or fluoride gas being released from the internal surface of the piping and the valve after cleaning is completed is reduced or eliminated. Accordingly, the occurrence of plasma ignition failure can

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be controlled. Moreover, when supply of fluorine-containing gas is stopped, fluorine active species is promptly discharged from the piping and the remote plasma discharge chamber. Reduction of fluorine adsorption also increases the efficiency of fluorine active species brought into the reaction chamber, thereby maintaining the activity of active species and improving cleaning efficiency. Applicants note that all of these advantages are outlined in the present Application, for example, paragraph 0025. Applicants note that this recited method step (*e.g.*, the use of fluorine passivated piping) is not taught or suggested in either Smith or EP '467.

Applicants note that new Claims 26 and 37 recite the structural version of the above recited method step, namely that an internal surface of the piping comprises a fluorine-passivated metal.

In summary, Applicants note that a step of opening a valve as recited, and/or the use of a through-flow valve, have not been taught. The use of fluorine passivated piping has not been taught in the art of record for the present combination. As such, a *prima facie* case of obviousness has not been established. As such, Applicants request that the rejection of Claim 1 be withdrawn and Claims 1, 11, and 23-39 be allowed.

Rejection of Claims 9-11 and 20-22 under 35 U.S.C. §103(a) over EP '467 in view of Smith in combination with Rajagopalan

The Examiner also rejected Claims 9-11 and 20-22 as being obvious under 35 U.S.C. §103(a) over EP '467 in combination with Smith and Rajagopalan, et al. (U.S. Patent Number 6,274,058, hereinafter "Rajagopalan"). Applicants respectfully traverse the rejection. Claims 9, 10, and 20-22 have been cancelled. Given the language of the rejection, Applicants believe that the Examiner may believe that the prior rejection could be relevant to certain elements in new Claims 23-39 and amended Claim 1. As such, Applicants will address these issues below.

The Examiner has asserted that the element from (now cancelled) Claim 10 of "opening a valve on the piping after conducting a CVD reaction and prior to supplying activated species, wherein opening a valve comprises withdrawing a valve body completely from a path to form an opening substantially as wide as internal surfaces of the piping," would be an obvious step to one of skill in the art. In particular, the Examiner asserted that, "the skilled artisan would have found it obvious to form such opening [substantially as wide as the interior of the piping] utilizing the

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on/off valve in order to provide fast release of reactive species into the processing chamber...” (Office Action, Page 8). Applicants note that no support has been provided for this assertion, nor do Applicants believe that relevant support for such an assertion could be provided, for the presently claimed invention, in the relevant field, without the teachings of the present application.

Applicants respectfully assert that the Examiner’s suggested motivation is not consistent with the state of the art at the time of the invention. Prior to the present application, various forms of restricting the flow of gas were routinely taught and considered desirable. For example, references in the art taught the use of “flow restrictors” which slowed down the flow, rather than accelerating it (*see, e.g.*, U.S. Pat. No. 6,274,058). Additionally, U.S. Pat. No. 5,788,778 suggests the use of a “flow restrictor” to prevent the free flow of gas in various processes. Applicants note that Shang (EP 0697467) teaches that a filter 56 should be placed between the remote chamber 46 and the processing chamber. A filter will result in the restriction of the flow of gas. The use of devices to restrict the flow, either due to filters or through the valve itself, was part of the art at the time of the present invention (*see, e.g.*, 0009-0011 and 0042 of the Application). Thus, it is clear that the proposed motivation, which is not supported by any cited reference, is not consistent with the actual teachings of the art. As an adequate motivation to combine the references has not been supplied by the Examiner, Applicants submit that a *prima facie* case of obviousness has not been established.

Furthermore, additional references, such as Fujimura (U.S. Pat. No. 4,718,976) (as well as the above references), also teach away from the claimed embodiment. Fujimura teaches a gas diffusing plate 25 which is “fixed in front of the activated gas” (FIGS. 3-5 and col. 3, lines 44-54). Clearly, Fujimura teaches that the gas can and should be obstructed to allow for diffusion, while the presently recited through-flow valve has the opposite effect of not restricting the flow between the remote plasma discharge chamber and the reaction chamber. (*See, e.g.*, 0026). Additionally, as noted above, the cited references also teach that it is desirable to restrict the flow of the gas, rather than to increase the flow.

Applicants note that using only partially opened piping was thought to be necessary for a variety of reasons (*e.g.*, a need for filters or maintaining pressure). The above references clearly teach away from fully opening the piping so that there is no resulting restriction of the flow. Thus, the prior art taught away from the presently recited invention. The Examiner is

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respectfully reminded that “a *prima facie* case of obviousness may also be rebutted by showing that the art, in any material respect, teaches away from the claimed invention. *In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997)” (M.P.E.P. §2144.05 III). As the state of the art appeared to teach that flow restriction was desirable, the art appears to have taught away from the presently claimed method. Applicants also submit that the Examiner’s proposed motivation is contrary to the teachings of the above references.

Applicants note that some of the advantages of the through-flow valve, and its use in these devices, are taught in paragraph 0021 and include, allowing for a reduction in deactivation of fluorine active species, which allows for “high-speed cleaning,” which is clearly evident in the superior cleaning speeds of the presently disclosed method over the method, for example, Smith.

Applicants note that the new claims, Claims 23-39, explicitly recite the “through-flow” valve. Applicants note that the addition of the claims addresses the issue raised on pages 7 and 8 of the Office Action regarding the importance of specific structural limitations in apparatus claims. Applicants note, as shown by the superior properties of the device and method, that such a structural limitation does result in a manipulative difference between the claimed device and the references. Additionally, as present Claims 23-39 are apparatus claims, Applicants submit that such an element must be given its appropriate weight.

Because the Examiner’s proposed motivation is inadequate (for lacking any reference or assertion as to why one of skill in the art would agree with it) and is actually incorrect given the state and teachings of the art, as noted above, a *prima facie* case of obviousness has not been established. Moreover, even if a *prima facie* case of obviousness had been established, it would have been rebutted by the fact that the above cited references actually teach away from the proposed combination.

### Conclusions

In view of the foregoing amendments and remarks, Applicants respectfully submit that the pending claims are in condition for allowance and request the same. If, however, some issue remains that the Examiner feels can be addressed by Examiner Amendment, the Examiner is cordially invited to call the undersigned for authorization.


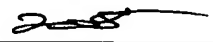
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Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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